

**THE CASE FOR PROTECTION AND COMPREHENSIVE MANAGEMENT
OF
LONG ISLAND'S GROUNDWATER AND SURFACE WATER**

A Grassroots Initiative to Create

The Long Island Clean Water Partnership

and

Restore and Protect Long Island's Water Resources



Where We Stand

The Long Island Clean Water Partnership (the “Partnership”) affirms the growing body of scientific evidence that Long Island’s water quality is unacceptably compromised, continuously declining and degraded by an increasingly diverse range of contaminants and pollution pathways.

We recognize that no singular, Island-wide management agency exists to protect and plan for the future of Long Island’s most valuable and vulnerable natural resource – our clean water.

We submit that water quality and quantity must be holistically managed as a top priority throughout the region. This requires fundamental change in the standards, methods and responsibilities for water quality protection and restoration assigned to every level of government and to ourselves as citizens.

We collectively envision regaining an Island lifestyle in which we can safely drink our groundwater and swim and fish in rivers, lakes and bays free of pollution. We must reestablish an environment in which shellfish and finfish are plentiful and safe to eat. We

must also restore the full economic potential of our island's clean water resources.

Given the gravity of this situation, we recognize that every private and public constituency must be enlisted to fundamentally and permanently change how we manage, regulate and ultimately value Long Island's water resources. We all rely on our water; we must each play a role in shaping a viable clean water vision for our future.

To set the stage for change, the Partnership created this Case Statement and Action Agenda to identify and explain the most pressing water quality and quantity issues facing our region and to unite civic, environmental, business, and government stakeholders behind a unified and strategic clean water agenda for Long Island.



Summary Case Statement and Action Agenda

Ensure public health, safety and welfare, and the health of our bays, harbors, drinking and surface waters by reducing nitrogen contamination in Long Island groundwater and surface waters, and by preserving high quality water resources from further degradation.

To achieve this goal, the Partnership endorses:

- Reducing fertilizer loads, and requiring advanced treatment upgrades to sewage treatment plants and septic systems (providing at least a 50% reduction in nitrogen over conventional systems) so nitrogen pollution does not exceed 2 mg per liter for ground water entering our bays and harbors
- Accelerating the use of wastewater treatment technologies to reduce nitrogen
- Developing new financing and public investment tools that attract more capital to innovative wastewater management projects

- Reforming New York State’s pesticide registration and application program to prevent further contamination of Long Island’s groundwater and immediately ban the most egregious scientifically proven contaminants, including atrazine, metylaxal, and imidacloprid
- Accelerating the identification and cleanup of chemical waste found in plumes of contaminated groundwater that threaten both drinking and surface waters
- Protecting Long Island’s groundwater and surface water by developing contamination standards and aggressively regulating the availability, handling and disposal of existing and emerging contaminants such as personal care products and pharmaceuticals
- Developing Island-wide, enforceable water conservation standards for private well users and public-water suppliers (including conservation pricing) to reduce freshwater consumption, especially in supply-sensitive and coastal areas with significant and seasonal freshwater limitations
- Establishing a unified entity uniquely qualified to address Long Island’s comprehensive water protection, restoration and management needs either within the New York State Department of Environmental Conservation (NYSDEC) or through an existing or newly established entity such as a Long Island Aquifer Compact (modeled on the professional water management compacts that operate throughout most of New York State and oversee up to 70% of the state’s surface waters). However established, the entity must have sufficient funding, technical competence and regulatory jurisdiction to monitor Long Island’s water resources; implement clean water strategies that reflect the relationship between Long Island’s ground and surface water resources; adopt enforceable, science-based standards; promote public education and input; and establish and evaluate measurable goals to restore drinking and surface water degraded by nitrogen, volatile organic compounds (VOCs), pesticides, and other harmful contaminants.

We Rely on Clean Water



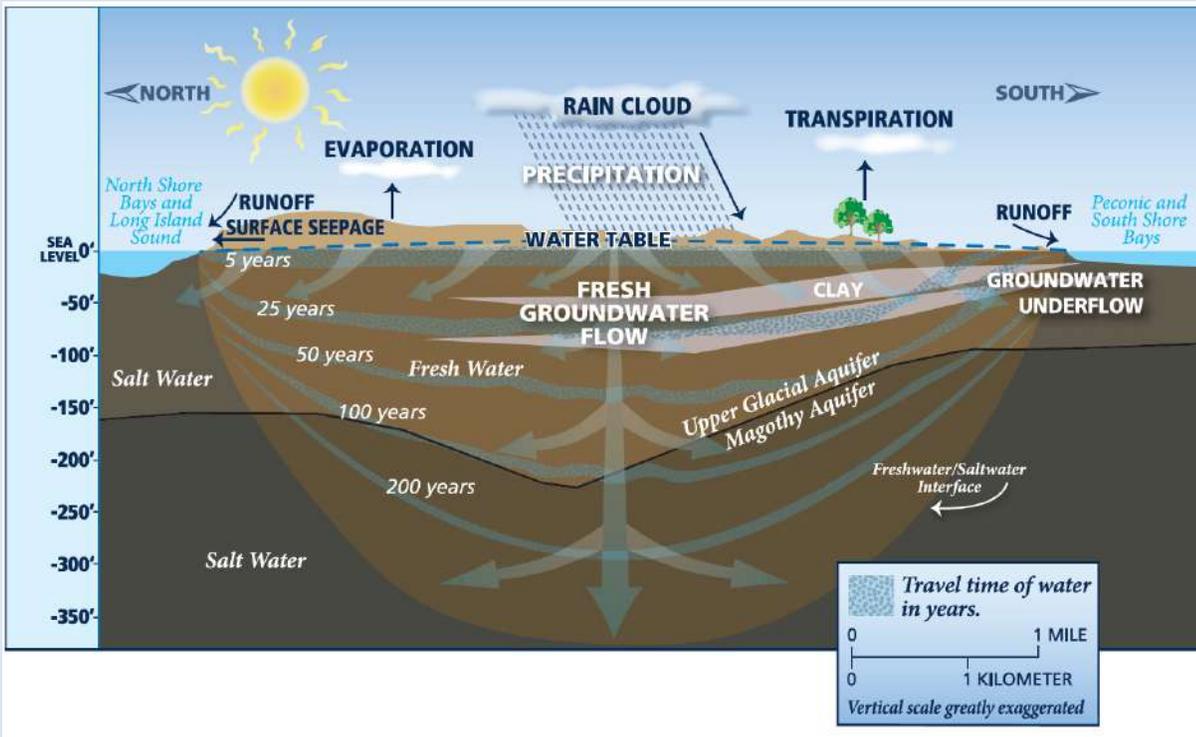
Long Islanders count on safe, clean, reliable, and affordable drinking water and clean waters in our ponds, lakes and streams, as well as our estuarine bays and harbors. Our economy is highly dependent on a robust tourist industry, which contributes about \$4.7 billion a year in economic activity, closely tied to high-quality surface waters through marine sports, sport fishing, commercial fishing, beach use, and more.

Protecting our drinking and coastal water has been a public priority for decades. In the past 30 years, Long Islanders have invested billions of public dollars in clean water infrastructure and environmental protection to ensure that our region’s groundwater and coastal waters remain pure. These investments have improved water quality but they are not enough. We need a comprehensive undertaking that changes how we view and protect our water. This document defines Long Island’s unique water quality challenges and the strategic actions needed to protect our water resources.

LONG ISLAND’S WATER STORY

Virtually every drop of Long Island’s fresh water comes from rain, melted snow, and ice. Precipitation falls during storms and slowly seeps into the earth until it reaches the groundwater or water table beneath our feet.

In heavily developed areas some precipitation along roads, sidewalks, decks, driveways, parking lots, residential lawns, and playing fields enters directly into surface waters as storm water runoff.



Contaminants also enter our underground drinking water in a variety of ways, from our septic systems to what we pour into our sinks or flush down the toilet to the buried fuel tanks near our homes to the pollutants we simply dump on the ground without concern.

Groundwater is Long Island's only source of public drinking water, accessed through private and public supply wells. That water is held in sandy and gravelly layers of saturated sediments known as aquifers.

Long Island has three main aquifer layers beneath it, all highly susceptible to contamination: the Upper Glacial aquifer (the layer of our groundwater closest to the surface, from which most private wells draw water); the Magothy aquifer (a deeper layer that supplies most public water wells); and the Lloyd aquifer, the deepest, oldest and least contaminated layer (containing water 2,000 to 8,000 years old). The Lloyd aquifer supplies only very limited amounts of drinking water to specific coastal areas.

All of Long Island's groundwater slowly flows through the sand and gravel of the aquifer layers out into our streams, creeks, bays, harbors and even the Atlantic Ocean. Whether precipitation is absorbed into the soil or travels as runoff along our roadways, sidewalks, parking lots and storm drains, water carries with it oils, sewage, chemicals, pet waste, pesticides, road salts, fertilizers, toxins and bacteria that it picks up along the way.

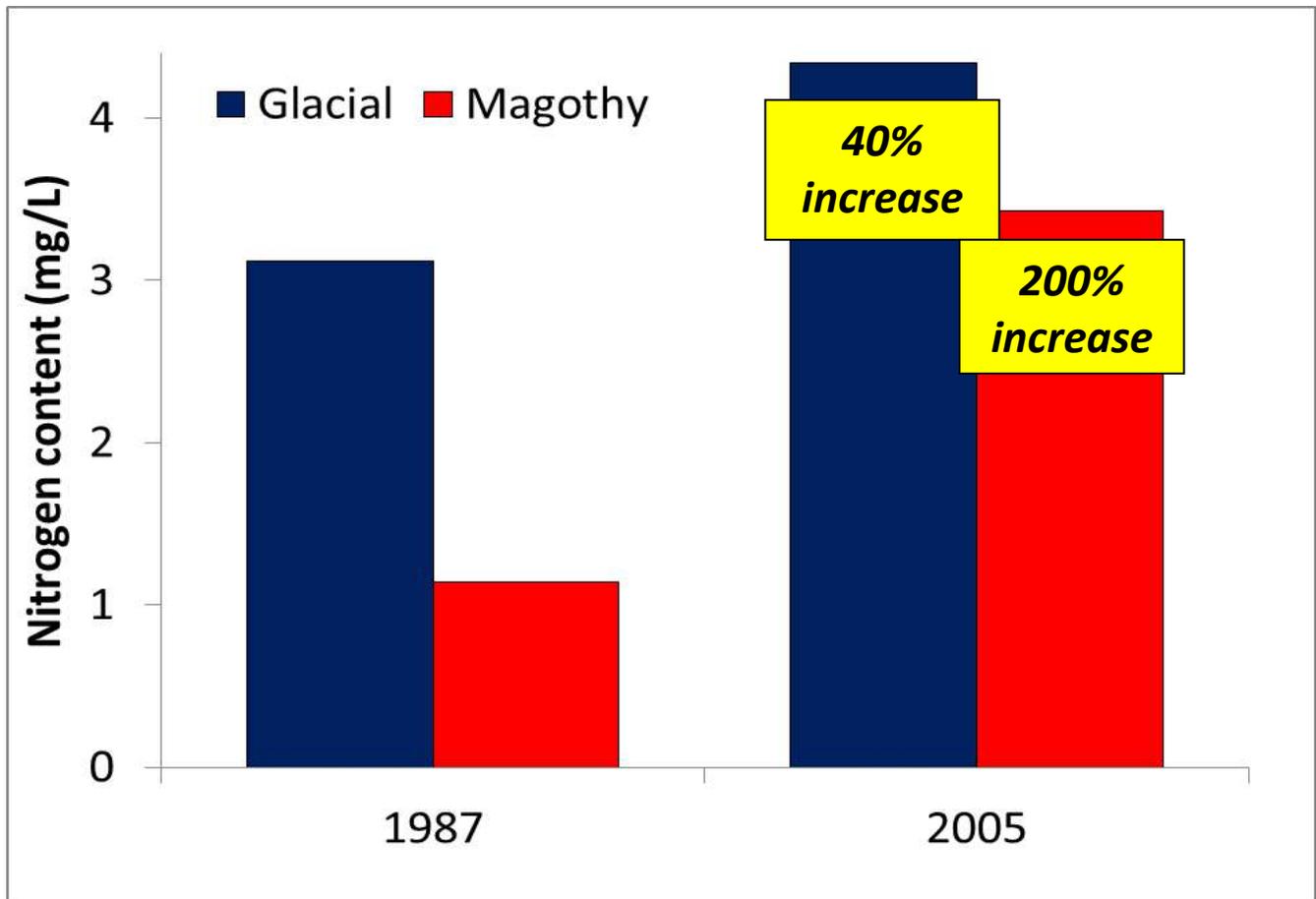
Our Clean Water Isn't So Clean Anymore

Over the last two decades groundwater and surface water purity have declined precipitously. A substantial body of government and academic research concludes that Long Island's water resources are significantly polluted and becoming worse daily.

Nitrogen Pollution from Human Wastewater

Symptoms of nitrogen pollution attributed to human wastewater and runoff are appearing in virtually every bay and harbor around Long Island. While the precise pathways can vary by geographic area (from overland runoff in Nassau County to individual septic systems in Suffolk County), the collective impact of nitrogen is now widely felt from the Western Bays in Nassau County to the Peconic Bay in Suffolk County and from Hempstead Harbor to Mattituck Creek.

18 year change in groundwater nitrogen levels



Suffolk County Comprehensive Water Resources management plan, 2010

Warning signs also abound in our drinking water supply – increasing levels of nitrogen pollution in groundwater can make drinking water unsafe. Discharging nitrogen into our coastal surface waters has impaired more than half of the South Shore bays, and the Western Bays are at high risk.

The recent Suffolk County Comprehensive Water Resources Management Plan (2010) reports rapid and large changes from 1987 to 2005 in nitrogen levels in all three of Suffolk County’s groundwater aquifers. Nitrogen concentrations in the Upper Glacier aquifer rose by 40% while levels in the Magothy aquifer rose by 200%. The Magothy trend is particularly alarming, as this deeper aquifer, once considered safe from human contamination, now contains more nitrogen than the Upper Glacier aquifer did 18 years ago.

Drinking Water and Surface Water Pollution Are Connected

In 2008 two leading academic researchers from the Marine Biological Laboratory in Woods Hole, MA, completed research commissioned by The Nature Conservancy, the New York Department of State and Suffolk County to examine the relationship between groundwater nitrogen and surface water quality.¹ They found that “wastewater is the dominant source of nitrogen to Great South Bay, particularly wastewater from septic systems, which account for 67% of the total land-derived nitrogen load to Great South Bay.”² These findings hold true in many other areas of Suffolk County, particularly along the South Shore and in other coastal areas without sewers.

Other sources of nitrogen pollution are residential and agricultural fertilizers, atmospheric deposition (nitrogen contained in precipitation), sewage treatment plants and runoff. These sources comprise a higher percentage of nitrogen pollution in areas like Nassau County that are served by public sewer systems.

Sewage waste is one of the main sources of nitrogen entering Long Island waters. Reducing this source will protect public health, natural ecosystems and drinking water.

A groundwater nitrate or nitrogen concentration of up to 10 mg/liter is considered safe for drinking; however, our coastal environments are far more sensitive to much lower levels of nitrogen.

In 2008 the NYSDEC declared Long Island’s entire South Shore Estuary Reserve system, stretching more than 60 miles, an “impaired water body” (under section 303(d) of the Clean Water Act). NYSDEC identifies nitrogen from wastewater as a reason for this unfortunate designation and states that cesspools, septic systems, and sewage treatment plants cause eutrophication, resulting in lower water oxygen levels and persistent algal blooms throughout this important ecosystem.

Algae Blooms and Water Quality

Many forms of algae play important roles in the marine environment. However, when our bays, harbors and coastal waters receive more nitrogen than healthy ecosystems can process or tolerate, the result is harmful algae blooms comprised of microscopic plant-like organisms (HABs, familiar to many as brown tides and red tides). HABs can create hazardous toxins and seriously impair water quality. Depending upon the specific variety, harmful algae can kill finfish,

¹ Kinney and Valiela, *Nitrogen Loading to Great South Bay: Land Use, Sources, Retention, and Transport from Land to Bay*, Journal of Coastal Research, Vol 27, Nov. 4, 2011.

² Kinney and Valiela, *Nitrogen Loading to Great South Bay, Management Scenarios (Report on Phase 2)*, March 2011, at 4.

cause shellfish die-offs, sicken people, and release potentially lethal neurotoxins that accumulate in shellfish that feed in red-tide areas (Van Dolah 2000).

Too much nitrogen also increases larger nuisance algae like sea lettuce (*Ulva lactuca*) that frequently accumulate in thick, decomposing mats on our beaches and can smother seagrass and other near-shore habitats on the bay bottom. When certain sea lettuces decompose, they release hydrogen sulfide, a noxious gas that even in small doses can trigger permanent neurological and brain dysfunction (Valiela et al 1997).

Harmful Algae Blooms Are Increasing

Widespread and long-lasting harmful algae blooms, like the brown tides along the South Shore of Long Island, can devastate shellfish populations by killing off juvenile clams and scallops, seriously impacting the livelihoods of local baymen and fishermen. Recurring brown tides devastated the Peconic Bay scallop industry and are thought to have decimated the hard-clam population of the Great South Bay since the 1980s. HABs are also bad news for the tourist industry. Although direct contact with most of these organisms is harmless, they turn waters murky brown or rust red, and many people avoid recreational activities in afflicted waters.

Moreover, some HABs on Long Island are a serious threat to human health (e.g. paralytic shellfish poison (Hattenrath et al 2010). A series of studies conducted during the past decade have demonstrated that all of the HABs occurring on Long Island have been intensified by excessive nitrogen loading (Gobler et al 2005, 2007, 2012; Davis et al 2009, 2010; Hattenrath et al 2010).



WHAT OTHER IMPACTS DOES NITROGEN POLLUTION HAVE ON OUR BAYS AND HARBORS?

- **Hypoxia:** Areas of low oxygen in the water column, already common in western Long Island Sound, usually result from algae blooms. As rapidly growing algae die, they decay, using up the oxygen dissolved in the water. This leads to habitat and species loss, including lower production of commercially and recreationally important shellfish and finfish (Rabalais and Turner 2001).
- **Loss of seagrass:** Seagrass meadows sustain robust shellfisheries and finfisheries here and around the world. Excessive nitrogen has been shown to have a direct, toxic effect on seagrass (Burkholder et al 2007). Thousands of acres have died off in Long Island's Eastern and South Shore estuaries. Historic photography and records indicate that there may have been as much as 200,000 acres of seagrass in 1930 in Long Island bays and harbors; only about 22,000 acres remain (NYS Seagrass Taskforce, 2009).
- **Salt-marsh retreat:** Salt marshes provide food, habitat and important nursery grounds for shellfish and finfish as well as foraging and nesting opportunities for coastal birds. Salt marshes protect upland and shoreline areas from flooding and erosion associated with storms. Recent research reveals that salt marsh roots decline with increased nitrogen input, which may hinder their ability to keep pace with rising sea levels. Marshes become more susceptible to erosion and drowning (Turner et al 2009).



- **Dramatic shellfish declines:** In the 1970s, bay-scallop fishery on Eastern Long Island and hard-clam fishery in the South Shore bays were the two largest in the U.S. Since then landings of bay scallops and hard clams have diminished 99% . The bay-scallop collapse was almost entirely due to the nitrogen-caused algal blooms (Gobler et al 2005). While hard clams were over-harvested in the 1970s and 1980s (Kraeuter et al 2008), they have failed to recover largely due to recurrent brown tides (Gobler et al 2005)
- **Acidification.** It is also now recognized that excessive nitrogen can acidify estuaries (Cai et al 2011), inhibiting the growth and survival of both juvenile finfish and shellfish (Talmage et al 2010; Bauman et al 2012).

Volatile Organic Compounds



Contamination by volatile organic compounds (VOCs) has seriously threatened Long Island's groundwater for decades.³ The three most frequently detected VOCs are tetrachloroethene (PCE), trichloroethene (TCE) and 1,1,1-trichloroethane (TCA). Other contaminants include the fertilizer additive Perchlorate, the gasoline additive Methyl Tertiary Butyl Ether (MTBE) and pharmaceuticals and personal care products (PPCPs).

Historically VOC pollution was often linked to industrial and waste-management sites where improper disposal practices created slow moving "plumes" of toxic chemicals in groundwater. Today VOC pollution is also generated by common commercial and residential products such as bathroom cleaners, solvents, paint strippers, oven cleaners, degreasers and other caustic compounds.

VOCs have created many chemical plumes and polluted both public and private wells on Long Island. VOC exposure has been linked to liver and kidney damage, neurological disorders and cancer. Many such plumes have and will cost millions of dollars to clean up.

In Suffolk County toxic plumes exist at many former industrial locations, including several current and former government installations from Brookhaven National Laboratory and Calverton Air Base in Riverhead to the Gabreski County Airport in Westhampton.

In 2005 Nassau County's Department of Public Works published the results of monitoring its groundwater between 2000 and 2004 and concluded "VOCs are the single most serious source of groundwater contamination in Nassau County."⁴

Eleven public-supply wells in Nassau County were severely contaminated, adding Hicksville, New Cassel, Westbury, Hempstead and Salisbury to the Superfund National Priorities List⁵. PCE, TCE, MTBE and TCA all appear with much greater frequency in private and public wells now than 18 years ago.

³ Dvirka and Bartilucci, 1987, CDM, 1998

⁴ Nassau County Ground water Monitoring Program 2000-2003 (Nassau County Dept. of Public Works)

⁵ http://www.nassaucountyny.gov/agencies/DPW/Ground_water.html

The Suffolk County Water Resources Management Plan (2010) also documents disturbing test results for VOCs in Suffolk County's drinking water:

- PCE detection in wells increased four-fold between 1987 and 2005
- From 1987 to 2005 PCE concentrations increased more than 100% in the 211 Upper Glacial public-supply wells. Similar trends appear in deeper Magothy wells
- TCE concentrations increased substantially in Upper Glacial and Magothy supply wells, confirming that VOC contamination is flowing deeper into our aquifers
- Between 2000 and 2003, 23% of the public-supply wells in the county (90 out of 400) required treatment for VOCs to meet drinking-water standards
- The gasoline additive MTBE was detected in 330 public-supply wells from 2000 through 2005, with 147 detections in 2005 alone.

The NYSDEC and US Environmental Protection Agency (EPA) need to detoxify groundwater plumes to prevent further groundwater contamination and discharge of VOCs and other toxic materials into surface waters.

We need to educate consumers and businesses about VOC contamination, phase out their use and find or develop suitable product substitutes.

Pesticides

According to the NYSDEC's Draft Long Island Pesticide Use Management Plan (2011) and the newly released Long Island Pesticide Strategy (2013), pesticides are found in almost one quarter of community supply wells, and the number of pesticide contaminants is increasing.

- 117 different pesticides were measured in Long Island groundwater
- Suffolk County found that 140 community supply wells (23 percent of the wells sampled between 1997 and 2006) contain pesticide-related compounds
- Of 834 private drinking-water wells tested for pesticides and pesticide by-products in Suffolk County:
 - Pesticide compounds appeared in 422 wells (51%)
 - More than one pesticide-related compound was found in 323 (40%).
 - More than five pesticide compounds were detected in 127 (15%).

New York State pesticide documents highlight three fundamental facts:



- Certain pesticides or their breakdown products can readily enter underlying aquifers
- Once in an aquifer, pesticides and their by-products may remain there for decades
- A number of pesticides in use on Long Island have been detected at concentrations that exceed New York State's Maximum Contaminant Levels, groundwater standards or guidance values.

Appropriate Actions Include:

- Requiring reregistration for all pesticides detected in Long Island groundwater, to include transparent testing information, detailed public reporting and additional assessments of short- and long-term exposure and consumption impacts
- Statewide banning of the most prevalent and dangerous pesticides found in groundwater, including the fungicide metylaxal, the insecticide imidacloprid, and the weed killer atrazine. These pesticides are linked to liver and kidney damage, endocrine disruption and possibly cancer. They are also toxic to birds, fish and crustaceans
- Holding pesticide manufactures legally responsible for groundwater contamination
- Educating consumers, manufacturers, farmers, vintners, landscapers and certified applicators about the water-quality contamination impacts associated with pesticides and the need to reduce their use and find or develop suitable substitutes.

Pharmaceuticals

A 2009 five-month Associated Press investigation found prescription drugs in the drinking-water supplies of 41 million Americans. Pharmaceuticals, including a broad range of products such as prescription and over-the-counter medications, veterinary medicines and illicit drugs, pose a growing threat to water quality.



Although the presence of pharmaceutical and personal care products has not been documented in Nassau County⁶, a recent study conducted by the U.S. Geologic Survey (USGS) and the U.S. Department of Interior (DOI) in coordination with Suffolk County⁷, found pharmaceutically active compounds

⁶ Nassau County Ground water Monitoring Program 2000-2003 (Nassau County Dept. of Public Works)

⁷ Occurrence of Pharmaceuticals in Shallow Ground Water of Suffolk County, New York, 2002-2005, USGS

(PhACs) in Suffolk County groundwater. The study collected 70 samples from 61 wells in the Upper Glacial and Magothy aquifers, tested the water for 24 different pharmaceuticals and found:

- Nearly 50% of the samples contained pharmaceuticals
- 126 positive detections of trace pharmaceuticals permeated the 70 samples
- The most commonly detected compounds were anti-seizure and antibiotic drugs.

Manufacturers and health-care institutions must create a viable plan to handle and dispose of unwanted pharmaceutical drugs safely.

State and local governments should provide consumers with convenient, safe, efficient and secure means to dispose of unused/expired pharmaceuticals and develop contamination standards for these products in drinking water.

Over-consumption and Saltwater Intrusion



In certain areas excessive pumping from Long Island’s aquifer system for irrigation, human consumption and industrial use (without sufficient freshwater replenishment) has disturbed the delicate equilibrium between our underground supply of available fresh water and the surrounding saltwater. When saltwater enters the aquifer it is known as saltwater intrusion and can render freshwater undrinkable.

For example, large quantities of water are regularly withdrawn from the aquifers beneath Nassau County for consumption and irrigation. Much of this water eventually flows out of homes and businesses into sanitary sewers that discharge into the ocean, Long Island Sound or our bays and harbors. Although the wastewater is thus treated, excessive groundwater pumping lowers the water table and allows saltwater to infiltrate the aquifer along the coastline. Large areas of impervious surface like roads and parking lots also redirect precipitation away from the ground (where it can replenish the aquifer) and directly into nearby surface waters.

Recent United States Geologic Survey (USGS) data show that saltwater intrusion may be accelerating in Nassau County⁸. The USGS detected several such areas and closed seven

⁸ Simulation of Variable-Density Ground-Water Flow and Saltwater Intrusion beneath Manhasset Neck, Nassau County, New York, 1905–2005. US Department of the Interior. US Geological Survey. Scientific Investigations Report 2008-5166.

public supply wells⁹. The USGS specifically identifies risk in Bayville, Long Beach, Atlantic Beach, the Great Neck and the Manhasset Neck Peninsula, and southwestern Nassau County.

The impacts of saltwater intrusion associated with shallow private wells, antiquated individual septic systems, and rising sea levels also appear in Suffolk County. According to the Suffolk County's draft Comprehensive Water Resources Management Plan (2010):

*There are adequate groundwater supplies to meet all potable needs within Suffolk County, however existing infrastructure is not adequate to respond to the increased water supply demand during hot, dry summer periods, primarily as a result of the increased use of automatic irrigation systems during the early morning hours, as exemplified during the summer of 2010.*¹⁰

However, the draft also points out:

*Sea level rise may have profound impacts on low lying coastal areas, particularly along the south shore, and on the [North and South] forks. The impacts of sea level rise on the location of the salt water interface must also be monitored and addressed from a water supply perspective.*¹¹

The Suffolk County Health Department suggests a comprehensive water-conservation program to reduce peak summer demand. The program would include:

- A County law mandating odd/even lawn watering days
- A County law mandating rain sensors to shut off sprinkler systems when it rains
- Significant investment in public education by public water providers to reduce consumption
- Possible rate adjustments to reduce seasonal demand
- A county conservation program that addresses all water suppliers.¹²

⁹ Simulation of Variable-Density Ground-Water Flow and Saltwater Intrusion beneath Manhasset Neck, Nassau County, New York, 1905–2005. US Department of the Interior. US Geological Survey. Scientific Investigations Report 2008-5166.

¹⁰ Suffolk County Comprehensive Water Management Plan, August 2010 draft: pg 4-39
<http://www.suffolkcountyny.gov/Default.aspx?TabID=1034&cid=5&fid=1261>

¹¹ Suffolk County Comprehensive Water Management Plan, August 2010 draft: 3-118
<http://www.suffolkcountyny.gov/Default.aspx?TabID=1034&cid=5&fid=1261>

¹² Suffolk County Comprehensive Water Management Plan, August 2010 draft: pg 4-42
<http://www.suffolkcountyny.gov/Default.aspx?TabID=1034&cid=5&fid=1261>

Why Has Our Water Pollution Become So Serious?



Many government agencies share responsibility for protecting Long Island's water resources. Unfortunately, water quality protection has never been effectively centralized. No single agency has final responsibility or public accountability for restoring and maintaining clean water. Water quality standards, rules, regulations, policies and programs derive from an array of local, regional, state and federal agencies. For example, in Nassau County alone 40 separate entities distribute drinking water: one state agency, 14 incorporated village/city agencies, one town agency, 19 special districts, three water corporations and two water authorities.

So far, comprehensive water quality management efforts on Long Island have failed. In 1992 the Long Island Comprehensive Special Groundwater Protection Area (SGPA) Plan focused attention on nine Special Groundwater Protection Areas and identified numerous protective measures for each. The SGPA Plan states (page 1-8):

“The SGPAs cover slightly more than one-quarter of the land area of the two counties and contain 60% of the remaining open lands. Planning for the appropriate, environmentally acceptable use of those properties is the most significant aspect of the study.”

Although the SGPA Plan provides a detailed blueprint for regional groundwater and watershed protection, it lacked an authority or mandate. Government agencies and municipalities have routinely dismissed the plan's recommendations for 20 years. Long Island needs and deserves effective and enforceable regulations with measurable goals and consequences for agencies and municipalities that fail to improve and protect water quality and quantity.

What Is At Stake?

At stake is a clean, safe, healthy environment, access to affordable drinking water; clean beaches and waterways for recreation; safe local fish and shellfish for food and industry; and attractive locations and activities for tourists who greatly support local businesses and Long Island's economy.



If we fail to act now, nitrogen and other water pollutants will only increase over time. We also now see the connection between the quality of our groundwater and surface water. Existing management strategies do not address this reality.

Without a comprehensive water protection plan, we can expect increasing brown and red tides, more pesticides in our groundwater and contaminants in our drinking water reserves and increasingly costly water treatment. We will also see the continued decline and possibly collapse of our near-shore fin- and shellfisheries due to nitrogen pollution.



The combined impacts of water pollution already cost Long Island businesses and residents tens of millions of dollars in lost revenues and higher taxes, with insufficient investment and attention to mitigating future costs. In the next two decades, indifference could cut substantially into Long Island's \$4.7 billion recreation and tourist economy and saddle residents with decades of compounded clean-up costs.

To avoid exceptional environmental, public health and economic costs down the road, we must mitigate the groundwater pollution now, even if the costs appear high relative to other perceived infrastructure needs. A comprehensive plan is our only viable insurance against further damage.

Once drinking water is polluted, cleaning it up is *very expensive*

Purifying tainted drinking water costs money. A plume of tainted groundwater from an old industrial site has polluted Bethpage Water District's wells. To make the drinking water safe, the district installed \$7 million in water filtration equipment and \$11 million in VOC filtration equipment. In 2012 the district bonded another \$14 million. Residents will pay \$940,000 a year for the next 30 years to ensure their water meets state standards. Aqua Water Company recently installed a \$4.5 million dollar filtration system in its Levittown water facility to mitigate pollution from the same plume.

The Suffolk County Water Authority (SCWA) has testified at New York State Legislative hearings that it spends millions of dollars annually to filter out pesticides, MTBE and volatile organic chemicals. 23% of SCWA wells have \$800,000 filter systems installed to remove VOCs.

The Water Wars Are Beginning on Long Island



As population and global warming escalate, Long Island's aquifers may become increasingly appealing to New York City. Pressures will mount to market and transport Long Island water to customers residing well outside locally sanctioned districts. Since Long Island is the only region in the state with no oversight agency/council empowered to preserve and vigilantly protect its water supply, such districts can effectively mete it out at will--even sell it with impunity.

Such a deal is currently under consideration. The Manhasset/Lakeville water district may respond to a New York City proposal to pump 5 million gallons of district water into Queens daily. This would set a reckless, perhaps irreversible, precedent that could jeopardize much of Nassau County's drinking water. Long Island's water is not a bargaining chip. It is neither negotiable nor for sale--certainly not at anyone's discretion. Regardless of incentive or motive, all such temptations must be earnestly rebuked. As demand and desperation for quality water increase, so will the financial incentive to market it, if not illegally, then certainly unethically.

Residential and commercial wastewater is one of the best documented, most well understood, widespread and manageable sources of pollution in our groundwater and near-shore surface waters. Focusing on removing/mitigating this source will optimize future water-quality initiatives,

but neither goal should detract attention from Long Island's many other water problems nor deplete resources already being allocated toward successfully remediating/obviating them.

What Can Be Done – And Who Should Do It?



Long Island's aquifers, bays and harbors are all connected and vitally important to the economic and environmental health of one of New York State's most populous regions.

Protection and restoration of Long Island's water resources deserves the attention and investment given other waters and watersheds of statewide significance, such as the New York City's critical watershed (the Hudson River) and Niagara Falls.

Comprehensive management is missing. Water management entails understanding the water resource itself, the aquifers that store our water and their relationship to surface and coastal waters. Water management applies what we know about the resource to how water is used, outlining steps to protect, conserve and respond to water issues and problems. It relies upon sound scientific information to create and implement sound policies and practices.

Long Island needs both a new management strategy and a unique water management entity focused on the region's comprehensive water quality protection, restoration and management. Whether through the NYSDEC, a newly defined agency or a cooperative Aquifer Management Compact, a leadership structure and apparatus must be established and empowered with the tools and duties of effective oversight of our waters.

Such comprehensive action is consistent with how the rest of New York State approaches water management. Long Island should be no different. Today three river basin compacts already manage 70% of the state's waters. Compacts carry out essential functions such as short and longer-term planning, annual data collection, developing water budgets and allocating water, setting protection policies, addressing quality and quantity, planning for droughts and floods, enforcing standards and more.

Long Island's precious surface waters and the nation's first federally designated Sole Source Aquifer demand protection under a single, focused, integrated and accountable structure with enforceable standards and measurable water quality goals.

Better Outcomes From Better Standards and Common Goals

Because Long Island's water pollution comes from a variety of sources, citizens and government at every level have important roles to play in restoring and protecting our groundwater and harbors and bays. Long Island needs a new and fundamentally different approach to water quality and management. The challenge is formidable, but the solutions are within our reach.

Water Action for Long Island

1. Federal Government

- Reauthorize the Clean Water Act
- Maintain or increase low-interest loans available through The Clean Water State Revolving Fund (CWSRF) to construct and repair advanced wastewater treatment systems.

2. New York State

- Adopt new groundwater discharge standards for sewage treatment plants and on-site sanitary waste water systems that ensure groundwater exiting a parcel of land or entering a surface body of water not exceed two parts per million nitrate/nitrogen.

- Establish an adequately funded, unified regulatory entity for Long Island’s water resources management with authority residing either with the NYSDEC or with a reorganized or newly created entity such as an aquifer compact that will implement the 2 mg/liter nitrogen limit within five years or less, and
- Develop and implement a comprehensive, effective, enforceable and affordable clean-water action plan (with Nassau and Suffolk County participation) for Long Island in cooperation with state and local agencies, municipalities, academics, water utilities, non-governmental agencies and other stakeholders to implement and evaluate effective water protection and management plans, policies and practices.
 - Develop effective and enforceable regulations with measurable goals and consequences for agencies and municipalities that fail to protect water quality.
 - Evaluate impaired water quality due to harmful chemicals (such as pesticides and VOCs) and consider additional research, bans, restrictions and working groups to address current and emerging issues
 - Identify, document and address all threats within the capture zone of public supply wells
 - Calculate the economic impact of implementing a source water protection program
 - Assess wastewater treatment performance and technological advancement
 - Create a “State of the Aquifer” report
 - Develop engaging public education strategies to inform elected officials and policy makers, as well as the public
 - Expand/enhance agricultural environmental management/rating programs
- Develop and implement emergency management plans to protect water quality as well as water supply and water treatment infrastructure Complete and implement the *LI Pesticide Use and Management Strategy*, and
 - Ban the three most prevalent pesticides in groundwater: metylaxal, imidacloprid and atrazine
 - Strengthen the pesticide registration program on Long Island
 - Exert stronger enforcement for violations of pesticide labels and applications on Long Island

- Reform pesticide rules to require stringent NYSDEC reregistration of all pesticides detected in groundwater
- Hold pesticide manufactures legally responsible for groundwater contamination and aggressively enforce these requirements.

2. County Governments

Suffolk and Nassau Legislatures

Develop a joint legislative agenda for clean water to:

- Develop a septic-system upgrade program to accelerate the use of advanced and decentralized treatment systems engaging local, state and federal assistance to provide substantial financial incentives
- Support county health agencies in cooperatively addressing on-site sewage treatment issues to advance system improvements, higher standards, expanded monitoring, improved compliance and better water quality outcomes
- Commit sufficient budgetary funds to support both county health departments so that they can effectively carry out their water supply, wastewater management and environmental health functions
- Commit sufficient capital funds to water quality infrastructure projects including land protection, advanced sewage-treatment technology and stormwater management
- Evaluate and address infrastructure resiliency in response to sea level rise and extreme storm events.

Suffolk County Legislature

- Create a new land-protection plan focused on water quality and watershed protection
- Complete the Suffolk County Comprehensive Water Resources Study
- Complete and implement Suffolk County Health Department's advanced wastewater treatment study for lower-flow septic systems
- Repeal Suffolk County Charter Law (39-2011) requiring the Suffolk County Legislature to approve any major water management or policy initiatives, which politicizes the Suffolk County Department of Health (SCDHS) 's decisions

- Reestablish the SCDHS groundwater planning and protection unit to ensure the highest level of water quality research, monitoring, assessment, regulation, conservation and enforcement and develop a strategy of increased collaboration with the NYSDEC and other clean-water regulatory agencies.

Nassau County Legislature

- Establish a permanent groundwater monitoring program in conjunction with the United States Geological Survey (USGS)
- Establish a land-protection program focused on Nassau County’s Special Groundwater Protection Areas
- Establish a groundwater planning and protection unit within Nassau County government to ensure the highest level of water quality research, monitoring, assessment, regulation, conservation and enforcement and develop a strategy for increased collaboration with the NYSDEC and other clean water regulatory agencies.
- Enact legislation for proper disposal of unwanted pharmaceuticals.

4. Town Governments

- Expand town land preservation programs and acquisitions
- Implement new state water quality standards and mandates
- Reform land-use approval to control development density, conserve water and promote innovative wastewater management plans
- Strengthen local ordinances governing wastewater disposal and stormwater.

5. Department of Education and Local School Districts



- Work with NYS Department of Education to enhance science curriculum to incorporate water quality protection and restoration as a mandatory content area
- Educate and empower school districts to inform their teachers, administration and students about why water protection is critically important and what they can do to make a difference

- Develop a marketing and awareness campaign to easily incorporate water protection and conservation efforts into everyday school and work life
- Develop briefing sheets for teachers and tips for kids that can make a difference
- Tap speakers from not-for-profit agencies committed to the cause to address school groups about the importance of this effort.

6. Citizens

Household Hazardous Waste (HHW) products and related practices (fertilizers, pesticides, pharmaceuticals, septic system maintenance, etc.) all affect water quality. Citizens and civic, business, academic and non-governmental organizations must engage all levels of government to advance the education and awareness necessary to change daily behaviors. Citizens and businesses must phase out the use of HHW products, find and develop suitable alternatives.

Long Island Must – Long Island Will!

Long Island faces an unprecedented water pollution challenge that requires an exceptional level of leadership, commitment, resources and innovation. For far too long, people across the island have been comforted by public pronouncements that the water is “safe and plentiful.” At times we have even been assured that, if it never rains again, we have hundreds of years of water available to us. Unfortunately, such claims can easily lead to complacency. Misinformation can lead to a false sense of security when the situation requires urgent action. Of course, those who study and worry about water have seen, and the science now confirms, that our water is highly vulnerable to many threats and that water quality is declining all across the island.

Fortunately, we Long Islanders care deeply for our water resources, and history shows that our citizens actively and consistently support public and environmental health--especially when it comes to clean water.

The Clean Water Action Plan for Long Island funnels this public passion and personal concern into positive and lasting results that will avoid the perilous and costly consequences of declining water quality.

This case statement is both a call to action and an outline of the actions most urgently needed protect our water resources. The problems have been identified and the solutions are within our grasp. No one else will do this job for us; we must all accept this challenge. It's a tall order, but working together we can get the job done.

We invite you to join your neighbors and friends, associations, businesses, civic leaders, public officials and conservationists to protect, manage and conserve the water resources of Long Island. This is the only water we have, and the future of our island very much depends upon its protection.

Poll Shows Long Island Residents Will Pay to Fix Nitrogen Pollution

Polling in April 2012 demonstrates that Long Island residents see a clear problem and are willing to pay higher taxes to reduce nitrogen from wastewater. The survey shows 71% of voters with sewer service and 65% of those with septic systems would be willing to pay between \$5 and \$20 per month, respectively, to develop and implement solutions to the water quality issues facing Long Island. Long Islanders want to do their part to improve water quality today, just as they have done in passing environmental, land protection and clean water initiatives over the last 25 years.

REFERENCES

- Baumann, H., Talmage, S. C., Gobler, C. J. 2012. Reduced early life growth and survival in a fish as a direct response to elevated CO₂ levels. *Nature Climate Change* 2: 38–41.
- Burkholder, J. M., Tomasko, D. A. and Touchette, B. W. 2007. Seagrasses and eutrophication. *Journal of Experimental Marine Biology and Ecology*, 350 (1-2): 46-72.
- Cai, W. J., Hu, X. P., Huang, W. J., Murrell, M. C., Lehrter, J. C., Lohrenz, S. E., Chou, W. C., Zhai, W. D., Hollibaugh, J. T., Wang, Y. C., Zhao, P. S., Guo, X. H., Gundersen, K., Dai, M. H., Gong, G. C. 2011. Acidification of subsurface coastal waters enhanced by eutrophication. *Nature Geoscience*, 4: 766-770.
- Davis, T. W., Harke, M. J., Marcoval, M. A., Goleski, J. A., Berry, D. L., and Gobler, C. J. 2010. Effects of nitrogenous compounds and phosphorus on the growth of toxic and non-toxic strains of *Microcystis* during cyanobacterial blooms. *Aquatic Microbial Ecology*, 61: 149-162.
- Davis, T. W., Berry, D. L., Boyer, G. L., Gobler, C. J. 2009. The effects of temperature and nutrients on the growth and dynamics of toxic and non-toxic strains of *Microcystis* during cyanobacteria blooms. *Harmful Algae* 8: 715–725.
- Gobler, C. J., Lonsdale, D. J., Boyer, G. L. 2005. A synthesis and review of causes and impact of harmful brown tide blooms caused by the alga, *Aureococcus anophagefferens*. *Estuaries* 28: 726-749.
- Gobler, C. J., Davis, T.W., Coyne K.J., Boyer, G.L. 2007. Interactive influences of nutrient loading, zooplankton grazing and microcystin synthetase gene expression on cyanobacterial bloom dynamics in a eutrophic New York lake. *Harmful Algae*, 6: 119–133.

- Gobler C. J., Burson, A., Koch, F., Tang, Y., Mulholland, M. R. 2012. The role of nitrogenous nutrients in the occurrence of harmful algal blooms caused by *Cochlodinium polykrikoides* in New York estuaries (USA). In press to *Harmful Algae*.
- Hattenrath, T. K., Anderson D. A., Gobler C. J. 2010. The influence of nutrients and climate on the dynamics and toxicity of *Alexandrium fundyense* blooms in a New York (USA) estuary. *Harmful Algae*, 9: 402–412.
- Kraeuter, J. N., Klinck, J. M., Powell, E. N., Hofmann, E. E., Buckner, S. C., Grizzle, R. E., Bricelj V. M. 2008. Effects of the fishery on the northern quahog (=hard clam, *Mercenaria mercenaria* L.) population in Great South Bay, New York: A modeling study. *Journal of Shellfish Research* 27: 653-666.
- NYS Seagrass Taskforce, 2009. Report of the New York State Seagrass Task Force: Recommendations to the NYS Governor and Legislature, March 3, 2009.
- Rabalais, N. and R. E. Turner (eds), 2001. Coastal Hypoxia: Consequences for Living Resources and Ecosystems. *Coastal and Estuarine Studies* 58, American Geophysical Union, Washington, DC, 454 pp.
- Talmage SC, Gobler CJ. 2010. Effects of past, present, and future ocean carbon dioxide concentrations on the growth and survival of larval shellfish. *Proceedings of the National Academy of Sciences of the United States of America*. 107: 17246-17251
- Turner, R. E., Howes, B. L., Teal, J. M., Milan, C. S., Swenson, E. M. and Goehring-Toner, D. 2009. Salt marshes and eutrophication: An unsustainable outcome. *Limnology and Oceanography*, 54: 1634–1642.